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ABSTRACT

The problems addressed, and solutions devised, by educational ethnographers in selection of and sampling from phenomena for internal representativeness external comparison are examined. The process of sampling is designated as a specialized form of the more general process of focusing and choosing in research, which is called selection. Common selection and sampling strategies are defined and illustrated from the literature in educational ethnography and assessed for their strengths, weaknesses, and implications for overall design credibility. (Author/AL)

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Sampling and Selection Issues in Educational Ethnography

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Sampling and Selection Issues in Educational Ethnography

The adaptation by educational researchers of ethnographic research design to the study of educational settings and problems has created a vast collection of studies during the past twenty years (e.g., Comitas & Dolgin, 1978; Gearing & Tindall,1973; Hansen, 1979). Although this literature has resulted in substantive and procedural contributions to the field of educational research, it is grounded in research methods only recently achieving systematization among educational investigators (e.g., Goetz & LeCompte, 1981, 1982; Patton, 1980; Rist, 1977; Smith, 1974, 1978; Wilson, 1977). As research designs, ethnography and its counterpart in sociology, community field study, were developed to investigate small, homegeneous groups of people whose natural sociocultural boundaries were limited to face-to-facce interaction (Goetz & Hansen, 1974). In these situations, sampling problems were restricted to an adequate representation from populations of phenomena often accessible in entirety. Anthropological ethnographers and field sociologists limited their responsibility to the accurate and valid reconstruction of only the group under investigation. Underlying this objective was the assumption that human groups are infinitely variable and that the researcher's responsibility was to document the group's idiosyncratic, distinctive, and singular characteristics and processes. Generalization of findings from groups studied to other populations frequently was relegated to ethnologists and other scholars interested in comparative analysis.

With the world-wide reduction in numbers of relatively isolated, homogeneous human groups and with the increased interest in examining segments of industrialized and developing populations, ethnographers and field researchers have confronted problems of sampling individuals and groups from larger populations to which they intend to generalize results (Pelto & Pelto, 1978; Schatzman & Strauss, 1973). In addition, researchers from other disciplines have sought to integrate qualitative or ethnographic research techniques into their designs, both to provide context for and to corroborate findings obtained by more experimental or positivistic means.

Whether the focus of research is ethnography in a classic sense, or is what we have termed quasi-ethnographic (LeCompte & Goetz, 1981a), researchers face the related problems of selection and sampling. In this paper, we have tried to distinguish between the two, designating the process of sampling as a specialized form of the more general process of focusing and choosing in research, which we have called selection. We have made this distinction because we believe that the term sample too often is used inappropriately to describe any collectivity under study, while use of the term sampling places undue emphasis on issues of statistics and probability in ways which may or may not be appropriate. Selection requires simply that the researcher delineate precisely the relevant population or phenomenon for investigation, using criteria based upon theoretical or conceptual considerations, personal curiosity, empirical characteristics or some other considerations (See Goetz & LeCompte, 1981c). These phenomena customarily include people, events, traits and responses of people, artifacts and other objects, time segments and settings. Once the population has been defined and identified, a researcher may or may not decide to sample from that population.

To illustrate: a researcher may select a population for investigation using any criteria he or she may posit. The population, once selected, may or may not be a sample. Sampling implies extracting from a larger group some smaller portion of that group, usually delineated so as to represent the larger group. Selection may be neither representative nor involve choosing units from a larger group. Sampling is usually undertaken because delaing with an entire population is too unwieldy, too expensive, too time-consuming, or simply unnecessary. It customarily involves addressing issues of probability, such that the sample can, with some measurable margin for error, be asserted to represent the whole group from which it was extracted. On the contrary, a researcher may which to study a whole group or some special subset of a group and not deem it appropriate to sample at all. Thus, while selection may pay need to issues of probability, it does not require such attention; rather, a clear definition of the special criteria for selection is critical.

This paper examines issues and problems addressed and solutions devised by educational ethnographers in selection of and sampling from phenomena, both for internal representativeness and for external comparison. Common selection and sampling strategies are defined and illustrated from the literature in educational ethnography and assessed for their strengths, weaknesses, and implications for overall design crediblity.

Some Initial Concerns

The first issue faced by researchers in general who use ethnographic techniques is that sampling and selection often are used for different purposes and in different ways by researchers who operate from different

paradigms. Researchers interested in generalizing their results to large populations go through an initial series of sequential strategies aimed at creating for their study a product--the sample--which as closely resembles that larger population as possible. Once the sample has been drawn, assuming that the population has been identified clearly, concern with selection and sampling procedures ceases and the real study begins. Sampling is simply a necessary precursor to the research.

Although ethnographers and other qualitative researchers may go through such initial stages of defining a population so that it can be handled logistically, their concern with selection and sampling does not end with the creation of the initial sample of study subjects, events, or traits. This is because ethnography views selection processes as dynamic, phasic, or sequential (Zeldit[illegible]962) rather than static. Its purpose includes using strategies to expand the scope of the study, refine the questions or constructs under investigation, or generate new lines of inquiry. This is because although some sets of phenomena can be identified and characterized as being of interest prior to entering the field, many others only will emerge as the field work proceeds. Consequently, sampling in ethnographic research is frequently a developmental, ad hoc procedure rather than an a priori feature of research design. This process is complicated further by the necessity for sampling for internal accuracy and external applicability.

A second issue involves the use and creation of generalizations. Statistically random sampling procedures are used to improve the degree to which formal inferences can be drawn about and generalizations made from smaller to larger groups. Ethnographers use logical processes and generalization too. However, they use information and sequential logical inferences,

based upon accumulation of many corroborative sources of data over a considerable period of time, rather than statistically based inferences at the conclusion of a study. In addition, inferences made by ethnographers tend toward explanation of phenomena and relationships observed within the study group; generalization is limited by the extent to which comparable studies with comparable groups can be found and analyzed for similarity. The distinction made above between the two uses of inference is, however, honored more in the breach than in practice. Most researchers generalize to larger groups, whether or not their selection and sampling procedures justify doing so. That is, most researchers, whether ethnographers or not, select a population because it is conveniently located and resembles a larger population of interest--for example, low income urban ninth graders in the middle school closest to the University or female freshmen psychology majors--and then, having sampled randomly from that group, publish the results as if they were typical of all low income urban ninth graders or all women in the United States. In fact, they are using for generalization purposes the same informal logical inferences used by all researchers in their analyses, but often without the checks offered by comparative study and without making the informal logical inferences they used explicit.

A third issue involves the degree to which subjects selected for a study actually are volunteers. People chosen for study may be mandated to be subjects by the researcher, may be merely solicited by the researcher, or may be participants who solicit a researcher. Typically, researchers define a set of criteria or a recipe which constitute a portrait of the group they want to study. They then engage in a search to locate groups which possess those characteristics and endeavor to obtain access and

permission to do the study. In this case, the subjects have no ability to define themselves as not appropriate subjects, since the researchers have, a priori, already defined them as members of the study group. In some cases, refusal to participate is not easy, but technically, all participants are volunteers and representativeness, at least of the initial group, is more likely. Reluctant potential subjects may choose not to participate, but they have no initial role in the decision to include them in the study. They also may be followed up as non-respondents and still end up in the final reports.

In a second approach, a researcher may identify a set of criteria and then advertise for willing subjects to select themselves in. In this case, potential subjects make two choices: first, they must decide whether or not they possess the desired characteristics (are they indeed sedentary women... or might they decide to start jogging next week? Are they really happily married couples--or did last week's fight disqualify them?). Second, they must decide whether to call the researcher and volunteer. In this instance, reluctant subjects are unlikely, but whole subsets of the desired group may be lost because their judgment calls differed from that of the researcher.

A third option exists in the cases where a subject goes looking for a researcher. Innovative programs, experimental projects, or outstanding individuals may find the lure of documentation and possible publicity irresistible and seek a researcher to evaluate or investigate their activities. Alternatively, research and evaluation may be a condition of funding for a program. This type of self-selection guarantees willing subjects, at least initially, but it requires different forms of inference

and reporting. Sampling to create a study population may be irrelevant in the latter two cases; however, sequential sampling for investigative purposes might be quite appropriate.

Criterion-Based Selection versus Probabilistic Selection

Like other researchers, ethnographers use statistical selection procedures--random or stratified--when they wish to study a small group that possesses the same distribution of characteristics as the larger population to which they wish to generalize.

Statistical selection may be inappropriate, however, under circumstances frequently encountered in ethnographic research, and in these cases other forms of selection are mandated: (a) when characteristics of the larger population have not yet been identified; (b) when groups possess no naturally occurring boundaries; (c) when generalizability is not a salient objective; (d) when populations are composed of discrete sets and characteristics are distributed unevenly among them; (e) when only one or a few subsets of characteristics of a population are relevant to the research problem; or (f) when some members of a subset are not attached to the population from which the sampling is intended. From a practical stand point, statistical sampling also may be inappropriate because it is deemed too risky not to study every member of a population (as is the case in some initial epidemiological studies) or where logistics or ethical considerations preclude sampling at all. For example, it may be cheaper and easier to include every member of the population in the study, or it may be that implementing sampling procedures will cost more time and effort than the improvement in data is worth. It may also be that selecting some

members of a group and not others for study could be obtrusive or offensive (Fink & Kosecoff, 1980).

Where statistical sampling to ensure representativeness is obviated by research circumstances, ethnographers aim for comparability and translatability of findings rather than for outright transference to groups not investigated. Assuring comparability and translatability (LeCompte & Goetz, 1982, in press) rests upon the systematic application of nonstatistical sampling procedures and provides a foundation upon which comparisons are made.

A number of writers have discussed the selection and sampling procedures used by ethnographers. These have been termed convenience sampling, comprehensive sampling, and a collection of purposive sampling techniques such as critical case sampling, deviant case sampling, typical case sampling, maximum variation sampling, and sensitive case sampling (Patton, 1980). Negative case sampling (Robinson, 1951; Znaniecki, 1934) and theoretical sampling (Glaser & Strauss, 1967) also have been discussed. Some of these terms are useful and help to discriminate among types of selection procedures. Others, like critical case sampling and politically sensitive case sampling (Patton, 1980) have been collapsed in this paper and subsumed under one rubric because they appeared to be identical. Still others, like the term convenience sampling, have been discarded because they do not seem to establish operational parameters. Selection on such basis as ease of access, convenience to the researcher, availability of samples, and other such fortuitous or accidental factors has frequently been designated as convenience sampling (Monheim, 1977) and even grouped as a strategy with purposive sampling (Patton, 1980). However, all researchers choose populations or samples which are, for whatever reasons, as convenient as possible, either because they are nearby, or if faraway,

because they afford an opportunity for exotic foreign travel or the chance to have one's very own tribe to study, unsullied by the touch of earlier investigators.

What we have done is to place all forms of selection under two general rubrics: probabilistic sampling and criterion-based selection. Simple criterion-based selection requires that the researcher establish in advance a set of criteria which the units for study must possess. Armed with this recipe for attributes essential to the selected unit, the researcher then searches for units that match the recipe. Many researchers distinguish between this approach to selection and probabilistic sampling by labeling it purposive sampling (Patton, 1980; Manheim, 1977). We find that label misleading because it implies that probabilistic sampling is somehow non-purposive, even mindless. Although some novices have been tempted to equate randomness with mindlessness, we argue that random and other probabilistic sampling strategies are highly purposive. We feel that this label should be shared across selection procedures and contrasted only with completely haphazard means of selecting data.

Ethnographers commonly use simple criterion-based selection in choosing the group or the site to be studied. Based upon the delineation of the research problem or questions and the empirical and theoretical factors considered to affect problem and questions, field workers develop a set of attributes or dimensions that must characterize a group or setting. They generally choose the first such person, group, or setting that not only matches those criteria but also permits the study. They also may try to locate several such groups and choose from among them the one most suitable.

Probabilistic selection, by contrast, involves extracting from an already well-defined population a subset for study that approximates the characteristics of the group from which it was derived. It involves using a mathematical procedure for assuring that the smaller group is representative of the larger.

Criterion-based selection is the starting point for all research. It precedes probabilistic selection, which must be preceded by criterion-based selection; probabilistic selection also may need to be preceded by extensive field work, in that the characteristics of a population must be known before any sampling can take place. The distinction between the two types of selection is presented here for heuristic purposes; in actual practice, most researchers use both. However, in positivistic traditions, once the initial research question has been determined-- and therefore, the population to be studied identified,--selection procedures use probabilistic techniques. Studies of this nature must rely on previous work in the field for enumeration of population characteristics upon which to base sampling procedures. Ethnographers, on the other hand, continue a process of sequential selection throughout the research process. Criterion-based selection is used to identify the population; it also is used to establish new sets of phenomena to examine as the research study unfolds. Critical to ethnography is its somewhat exploratory and open-ended nature; thus a variety of selection processes can and are used fruitfully throughout the stages of problem identification, data collection, and analysis. As will be indicated later, they may be used as well in the final stages of a project, while refining and corroborating the results of a study.

Probabilistic Sampling

Probabilistic sampling procedures used by social science researchers are of two types, systematic and random. Simple random sampling, which involves using tables of random numbers to assure mathematically that no particular unit has any greater chance for inclusion than any other, is the best understood form of sampling. It is used less commonly than other strategies because the conditions required for its use are difficult to achieve. It requires that the population to be sampled from be selected first; that every unit in that population be identified, and that each unit be accessible to the researcher for study. This is to assure that each unit has an equal probability of being selected (Pelto & Pelto, 1978).

Systematic sampling is a more commonly used probabilistic strategy. Systematic sampling requires the researcher to select an element from the study population at some appropriate interval, determined by the ratio between the needed sample size and the size of the total population. For example, one may select every fifth name from the telephone directory or every ninth student from a high school class. Orders used--numerical chronological spatial, alphabetical-may vary. While the entire population should be sampled at the given interval to guarantee representativeness, this procedure does not absolutely require that all units in a population be identified in advance of selection nor be immediately accessible, nor that the size of the population be known. For example, if the population to be studied is a specific set of behavioral interactions-flirting in high school hallways, for example-the total number of such interactions in a given day might not be known, but one could systematically select every third such interaction from a videotape recording for analysis. A major

difficulty with this strategy is establishing that the sampling interval is not confounded by some corresponding fluctuation or variation in the population (Gordon, 1975). A school ethnographer, for example, who planned observations every fifth day throughout the school year might conclude the study with an excellent analysis of end-of-the-week schooldays, but the data would have questionable relevance to other periods during the school week.

Social science researchers may use both systematic and random sampling; ethnographers, frequently use both to assure internal validity in their studies. When observations must vary across time periods, settings, events, or individuals, ethnographers sample these units randomly to make sure that their findings are representative of the entire population. More commonly, however, variations on simple random and systematic sampling are used. These may be either cross-sectional or longitudinal strategies. Cross-sectional strategies includes stratified sampling and cluster sampling. Longitudinal strategies include trend analysis, cohort studies and panel studies. All five of these variations effectively elaborate and diversify probabilistic sampling procedures; they also have been used in many forms to facilitate more effective criterion-based selection.

Cross sectional strategies

Cross sectional strategies are appropriate when researchers are interested in a population at only one point in time. Among them, stratified samples are mandated for those populations composed of generally discrete and differentiated subgroups. In this procedure, the total population is divided into relevant subsets and individuals are selected from each subset.

It may be used with either random or systematic sampling techniques, and the strata may be selected from equally, or weighted either to match representation of subgroups within the total population or to achieve at least minimal representation of very small subsets which might otherwise be missed. Our school ethnographer, for example, would have achieved a more representative sample of weekly schooldays by first stratifying the school year by days of the week and then sampling by days.

Cluster sampling also may be done randomly or systematically. Cluster sampling is a procedure used when the population to be studied can be aggregated, natually or analytically, into groups that are fairly similar. It is generally well adpated for use with very large populations or where sampling individuals from a population would be disruptive. For example, research in schools frequently uses classrooms, rather than individual students, as the unit for study because pulling individual students from their lessons is considered difficult, and schoolchildren generally are found in natually occurring groups of similar size and often similar composition. Cluster sampling first requires that the clusters be sampled, and then, if desired, individuals from within all selected clusters can be studied. When clusters are successively defined and sampled prior to arriving at the group to be studied, researchers term the process multistage cluster sampling.

This strategy requires that researcher account for any biases introduced by the initial division of population into units. Cluster sampling is frequently used by researchers such as demographers and survey analysts who require samples representing large populations. Initially designated clusters may be city blocks, neighborhoods, towns, factories, or schools;

the requirement is for naturally occurring and mutually exclusive units that are equally hetereogeneous for the targeted population. On a small scale, our school ethnographer may use cluster sampling when obtaining a sample of student respondents. Dividing a school into clusters of classroom, randomly choosing a sample of classrooms, and sampling students from only those classrooms may provide an ethnographer with data representative of overall student opinion of common student social customs, or of patterns of student academic work habits.

Longitudinal studies

Longitudinal studies are mandated when a researcher wishes to assess change in a population over time. Hence, the goal is to sample as much as possible from the same population at different points in time.

Trend studies involve successive sampling--random or systematic--of a population defined by particular characteristics or by a common geographic location. A disadvantage of this strategy can be that the elements that compose the population will be different at the different time intervals. Sampling a school faculty at two-year intervals over a ten-year period will supply data that may be based upon the same types of individuals, but it will include not only those who remain for the 10-year period--but also those who were present at every stage and left, as well as their newer replacements. Nevertheless, this may be a valuable way to assess changes in faculty over time.

A more sophisticated approach to the investigation of faculty change might use a cohort study. Here, populations are defined either by age or by some uniform length of experience. An ethnographer may survey--randomly or systematically--a group of first-year teachers. Five years later, the

fifth-year teachers would be sampled; and ten years later the tenth-year teachers would be examined. With a cohort design, researchers are better able to distinguish between changes resulting from life cycle influences and those reflecting a general historical trend; thus strengthening internal validity. Again, this strategy suffers from the disadvantage that the successive populations may be composed of different elements due to attrition and accretion.

In cases where this poses a serious threat to the legitimacy of results, researchers may choose a third alternative, the panel study. In this case, a population is sampled at some point in time, and the sampled elements are followed over succeeding periods. A researcher may randomly select individuals graduates from a teacher preparation program and interview them at designated time intervals to assess changes related to life cycle factors. This strategy also has disadvantages. Mortality remains a problem. The representativeness of the sample becomes more questionable the longer the interval between sampling and data collection. Many ethnographers have been able to use adaptations of both cohort and panel designs by returning to their original study sites from time to time to assess changes.

Criterion-Based Selection

As is true for the probabilistic sampling strategies discussed above, simple criterion-based selection is a process for choosing data units that has a number of variations. Simple criterion based selection requires only that the researcher create a recipe of the attributes essential to the selected unit. The selection process then becomes one of finding or locating a unit that matches the recipe. Variations in simple criterion-based selection can be divided into two groups. The first is composed of

strategies generally used to locate an initial group or setting for study or to select from initial populations determined to be relevant during early phases of research. This includes comprehensive selection, quota selection, and selection on the basis of extreme cases, typical cases, unique cases, reputational cases, ideal-typical or bellweather cases, or comparable cases.

The second group of selection strategies involves those which are used in the later stages of the research study. They involve processes of analysis, hypothesis generation and refinement, and elaboration. These strategies are sequential selection; they include negative case selection, discrepant case selection theoretical sampling, and selection and comparison of cases testing theoretical implications.

Comprehensive selection strategies are the ethnographer's ideal type. Using them, the researchers examine every case, instance or element in a relevant population. Representativeness is guaranteed by virture of universal coverage. Ethnographers who study small, bounded populations over long periods of time are able to sample comprehensively across the populations of participants, events, settings, and other relevant phenomena, because each pertinent population is manageable in size and the effort to select subsets requires more resources than merely to examine every instance. Historians and sociologists may be confronted with similar situations when the topic of interest is some narrowly defined public role, such as a study of the Secretary of Education (formerly the Director of the Office of Education). A researcher examining the relationship between this office and trends in national educational policy would sample comprehensively across office holders because the total population is so small. A second reason for sampling comprehensively occurs when the researcher

has reason to believe that a population is composed of elements so heterogenous that selection and sampling processes would result in the loss of important variation. This happens most frequently when a population is still poorly understood. For example, autism is a mental condition incompletely conceptualized. Cases are rare, and vary from one individual to the next. A school district that wished to evaluate its facilities and programs for mainstreaming autistic children would need to select all the children for study.

Resources to select comprehensively are rarely available, and population sufficiently small to examine totally are rarer still. Where probabilistic sampling is inappropriate and comprehensive selection is precluded, researchers may use simple criterion-based selection or one of its variants.

Like comprehensive selection, quota selection --sometimes called maximum variation sampling (Patton, 1980)--is intended to be representative. However, quota selection tries to work with a representative subset of some larger population. In this procedure, researchers first identify the major, relevant subgroups of some given universe. A school ethnographer may divide a high school student population into groups by grade level, sex, and race. The researcher then proceeds to obtain some arbitrary number of participants in each category, such as black male seniors, black female seniors, and white male juniors etc. Where these groups compose differential percentages in the population, the quota may be weighted to reflect these ratios. Although the obtained selections are only approximations--rather than probablistic samplings--the selections do correspond to relevant dimensions characterizing the population.

Criterion-based selection procedures are frequently elaborated into variations serving a variety of purposes. In each case selection is based upon comparison across cases or across dimensions of cases. Whereas probabilistic sampling and both comprehensive and quota selection aim at representativeness, the following variations aim at acquisition of data that may be used comparatively.

Extreme case selection involves first the identification, whether explicitly or implicitly, of some norm for typical cases. It is based upon arraying all cases on continua that express dimensions or groups of dimensions of interest in the research study. Researchers seek instances reflecting the extremes, or poles, of these continua so that comparisons against the norm may be made and light shed upon more moderate cases. For example, a comparative case analysis of a very large school and a very small school (e.g., Barker & Gump) allowed researchers to identify factors common to both that may be shared with all sized schools as well as special distinguishing factors that may be affected differentially in schools of different sizes. To identify extremes, however, Barker and Gump first had to know what the mean size for a school was.

Much the same process is undertaken in selecting for the typical case. In this procedure, the researcher develops a profile of attributes possessed by an average case, and then seeks an instance of this case. Wolcott (1973) sought a typical elementary principal for his role analysis of that institutional status. He eliminated women, people who were too young or too old, single males, and other individuals atypical of those holding elementary school principalships. Using a profile of principals developed

in a national survey, he was able to create a description of a typical elementary school principal. His task was then reduced to finding a real-world match who would permit himself to be studied.

Unique case selection or choice of cases that are unusual or rare are frequently based upon some dimension or attribute that functions like an experimental treatment, but that would be precluded from actual experimental manipulation by virture of ethical prescription, accidental occurrence, or empirical or historical impossibility. Whatever other attributes such cases may share with a larger population, this dimension sets it apart. Where historical events are concerned, whole populations may be considered unique and set apart from other populations during successive times. For example, schoolchildren who witnessed the Watergate investigation, hearings, and trials through the mass media may be considered a unique population--relative to their successors and predecessors--with respect to political socialization. Researchers studying this process during the mid-1970s had an opportunity to document the effects of a rare political phenomena. More commonly, ethnographers and other field researchers select one or a few cases for unique or rare attributes. For example, schools may be chosen for their adoption of a unique innovative program; student groups may be selected for some unusual ethnic composition; teachers may be chosen for unique background characteristics.

Reputational case selection technically may be a variety of extreme case or unique case selection. In this procedure, the researcher chooses instances on the recommendation of experienced experts in an area. Principals may be asked to recommend their most competent teachers. State department officials may be requested to recommend the most or least successful of some program.

Ideal-typical or bellweather case selection is a procedure in which the researcher develops a profile of an instance that would be the best, most efficient, most effective, or most desirable of some populations and then finds a real-world case that most closely matches the profile. Such selection does occur fortuitously: "if it won't work here, it won't work anywhere." This is the bellweather version of idea-typical selection, and cases of these kinds are most likely to be foisted upon researchers rather than sought by them. In that sense, they are related to reputational case selection.

Finally, comparable case selection constitutes the ethnographer's version of replication. This process is commonly used by a single researcher across a career of studying a variety of groups or sites that share central, relevant attributes. For example, Goetz's second ethnographic site (1981a, 1981b) was chosen for attributes it shared with her first site (1976): a rural consolidated elementary school servicing a rural-transitional population dependent upon surrounding urban areas for economic livelihood. Less commonly, a researcher may choose a comparable group or site in order to replicate the work of a predecessor.

Simple criterion-based selection and its major variants are used in the early phases of research to make initial choice of who and what to study. A second form of selection takes place in later stages of the research study. Ethnographic and qualitative researchers continue the sampling process throughout the period of data collection and analysis to refine questions and expand inquiry. Thus, selection processes become sequential.

Sequential Selection

Sequential selection is the process of selecting an instance or element of data on the basis of patterns emerging from analysis of prior instances and elements. Most forms of sequential selection are designed to facilitate emergent constructs and theories and to eliminate rival constructs, theories, and hypothesis. Whereas most probabilistic samples and criterion-based selection are defined, designated, and obtained during initial phases of research activity, sequential sampling begins only after sufficient data have been collected to initiate the analytic process. Sequential selection, therefore, generally is restricted to those research designs--such as ethnography--in which data collection and data analysis proceed simultaneously and mutually influence each other. It can be used across those designs considered inductive, generative, or a posteriori. The size of the sample selected is dependent upon the number of units required to generate and refine an abstract concept or postulate. Selection continues only as long as instances indicate the construct is sufficiently elaborated to account for new instances (Zeldith, 1962).

The most common form of sequential selection is negative case selection. A negative case of a concept or postulate is a case that refutes or disconfirms a construct. It is the exception to the emergent rule. In some respects, it functions as a null hypothesis. Researchers attempt to qualify the universality of emergent constructs by a deliberate search for instances that contradict it. Negative cases allow researchers to establish the perameters or distribution of a construct. Negative case selection also provides instances that indicate the degree of applicability of a construct and the conditions or circumstances under which it can be expected

to obtain. For example, a school ethnographer may find that high school students are expected to interact freely among themselves only in five kinds of situations. To refine this emergent construct of peer interaction, the researcher deliberately searches for exceptions to the developing rule. Such exceptions allow the typology of permissible interactive situations to be qualified by whatever circumstances appear in the negative instances obtained. When additional negative cases indicate no further new circumstances, the selection process ceases.

A procedure related to and sometimes indistinguishable from negative case selection is discrepant case selection. Researchers may or may not designate them as different activities. When they are differentiated, the discrepant case is considered to be an instance that modifies, refines, or elaborates a construct. Whereas the negative case is the exception to the emergent rule, the discrepant case is a variant of the emergent rule. A discrepant case requires that a construct be modified to some degree. Using discrepant case selection, the researcher searches for any pertinent instances for which the emerging construct cannot account. These are not so much contradictions, as is the situation with a negative case, as they are cases that fail to fit the emergent construct exactly. To return to the example cited above, a search for and discovery of a discrepant case for the five kinds of allowed peer interactive situations may result in the identification of a sixth category, in the collapse of two categories into one, or in the elimination of a category.

Negative and discrepant case selection may be guided by common-sense assumptions, by empirical or participant concerns, by evaluative or normative expectations, or by explicit theoretical and conceptual frameworks

used in a semi-deductive fashion. They are most commonly used, however, when reseachers wish to generate new theory about some topic from data collected for that purpose.

Under those circumstances, negative and discrepant case selection are frequently combined with the search for positive instances of a construct in another selection process called theoretical sampling (Glaser and Strauss, 1967). Theoretical sampling is a sequential selection process whereby the emergent features of a theory determine which successive cases or instances will be chosen for examination. The researcher begins with the selection of several instances that may be compared and constrasted. They are chosen for their potential relevance to the theoretical domain designated for study. During the early phases of data collection and analysis, selected instances are chosen for a high degree of similarity. During later phases, instances are chosen for a high degree of differences. Glaser and Strauss advocate this proces of minimization-to-maximization of differences in instances selected because of its usefulness in generating theory. Similiarities permit the identification of a category, the delineation of attributes of a category, and the specification of conditions under which categories will be found. Differences among instances chosen permit elaboration of category attributes, identifiation of variations in categories, and qualification of categories.

Returning to the peer interaction example cited above, a researcher using theoretical sampling would frame the phenomena far more broadly. The goal might be a theory for adolescent peer interaction. Although the researcher might begin with instances collected in a school setting, eventually the theory would require the maximization of differences created

by collecting instances of interaction in such diverse environments as shopping centers, community social centers, or automobile race tracks. An eventual component of the theory might be a typology of the circumstances under which teenagers interact, unfettered by adult supervision. This might be somewhat comparable to the school-specific typology suggested above, but its theoretical framework would provide it with a wider scope.

Finally, Campbell (1979) articulates a sequential sampling strategy used informally by anthropologists and other field researchers. This involves the specification of the implications of a theory, the selection of instances to test those implications, and the appraisal of the theory on the basis of whether its implications hold true for the selected instances. This strategy is particularly useful in situations where two or more theories are legitimate competitors for explanation of some phenomena. For each theory, the researcher identifies implications. For example, if adolescents interact with each other in hierarchically arranged cliques, then they will arrange their daily schedules to maximize association with clique members (Cusick, 1973). The researcher selects data instances to permit examination of such an implication. Although only one implication is given here, the adolesccent clique interaction theory will have many other implications for which cases may be sought. Campbell suggests that researchers construct a running score of hits and misses for the implications of each alternative theory. The theory with the most frequent hits should be the most convincing.

Conclusion

Choice of selection and sampling strategies depends upon the goals and questions formulated by a researcher, the nature of the empirical or real-world unit that is to be studied, overall theoretical and conceptual

frameworks informing the study, and the credibility intended or sought by the researcher in generalizing or comparing obtained results. Most research conducted in education is a complex combination of the variants of criterion-based selection and probabilistic sampling. Terman ( ), for example, used extreme case selection in choosing highly gifted children to follow over time in what became a criterion-based, panel selection. Likewise, many survey analysts and experiments use criterion-based selection to delineate a group or population, from which they then sample randomly.

Probability sampling is the most effective means to assure that characterization from a subset accurately represent a larger universe, although comprehensive selection and quota selection may be adequate substitutes. Such strategies are essential for generalization to groups not investigated. Nevertheless, such sampling must be preceded by effective criterion-based selection to ensure credible delineation of populations. Criterion-based selection is also most effective in examining little-known or extremely heterogeneous populations, highly permeable and diffuse populations, or extremely small or rare populations. In these cases, the precision required in delineating criteria for selection provides the researcher with the dense detail essential for eventual comparative analysis.